DOMINANT VS. NON DOMINANT HAND

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The hypothesis tested by this experiment reads as follows:

> *"The dominant hand will have a marginally faster reaction time in comparison to the non-dominant hand."*

To test this, a data set out of a population of 2000 was taken from the Australian School Census of Year 8 boys and girls nationwide. The Census was from the year 2012. Out of this population a maximum sample of 200 were randomly selected.

The issues surrounding using a secondary source for data include the fact that for those partaking in the Census it would be very easy to cheat the system and write an incorrect response when asked for their reaction time. If we had supervised students being tested we would have a higher chance of eliminating **outliers**, which are any extreme data in the set. The downside of supervising students is it would take a considerable period of time to collect and review the data. Also, we are not sure what students were asked to react to (for example where they tapping with a pen, was their knee being tested, was it an engaging activity, was the reaction involuntary etc.), and this could once again alter the results.

In the original, unmodified sample of the dominant hand the quickest reaction time was 0.01 seconds, and the slowest was 10.42 seconds. It has been said by the IIAF (Association of Athletics Federation) that it takes the human brain at the very least 0.1 seconds to react to something, so anything quicker than that is incorrect and considered invalid.

To remove outliers in the sample, anything under 0.1 seconds was removed (as it is acknowledged that it physically impossible to react quicker than that, and we assume we haven't got somebody with super-human reaction times) and anything 1 second and over was removed (the likelihood that somebody would take a full second to react without being distracted is minimal). By removing outliers the reliability of the data is increased, and the median and mean will be affected.

Interestingly, the **mode**, or most common value, remained the same (0.37 seconds) in all of the samples, including the samples with outliers. The median, or the middle value when the data is arranged in order was the same for the non dominant hand with and without outliers was 0.4 seconds and there was only a 0.01 of a second between the dominant hand with outliers included (0.38 seconds) and the dominant hand (0.37).

In the sample with outliers included, the dominant hand had an average, or **mean**, of 0.466 seconds (the aforementioned figure and following figures has been rounded to three decimal places for simplification) and the non dominant hand had a mean of 0.484 seconds, making the dominant hand faster, but as this sample has outliers included, it is invalid.

With the outliers removed, the mean of the dominant hand's reactions was 0.398 seconds, and the non dominant hand had an average of 0.405 seconds, so based on this data the dominant hand, on average, is 0.007 seconds faster than the non dominant hand in terms of reaction time.

It is perhaps surprising that the fastest person with a valid reaction time was 0.15 seconds, but this was achieved with their *non dominant hand*, despite our research stated that on average the dominant hand was quicker. The person with the slowest valid reaction time (0.99 seconds) accomplished it with their dominant hand.

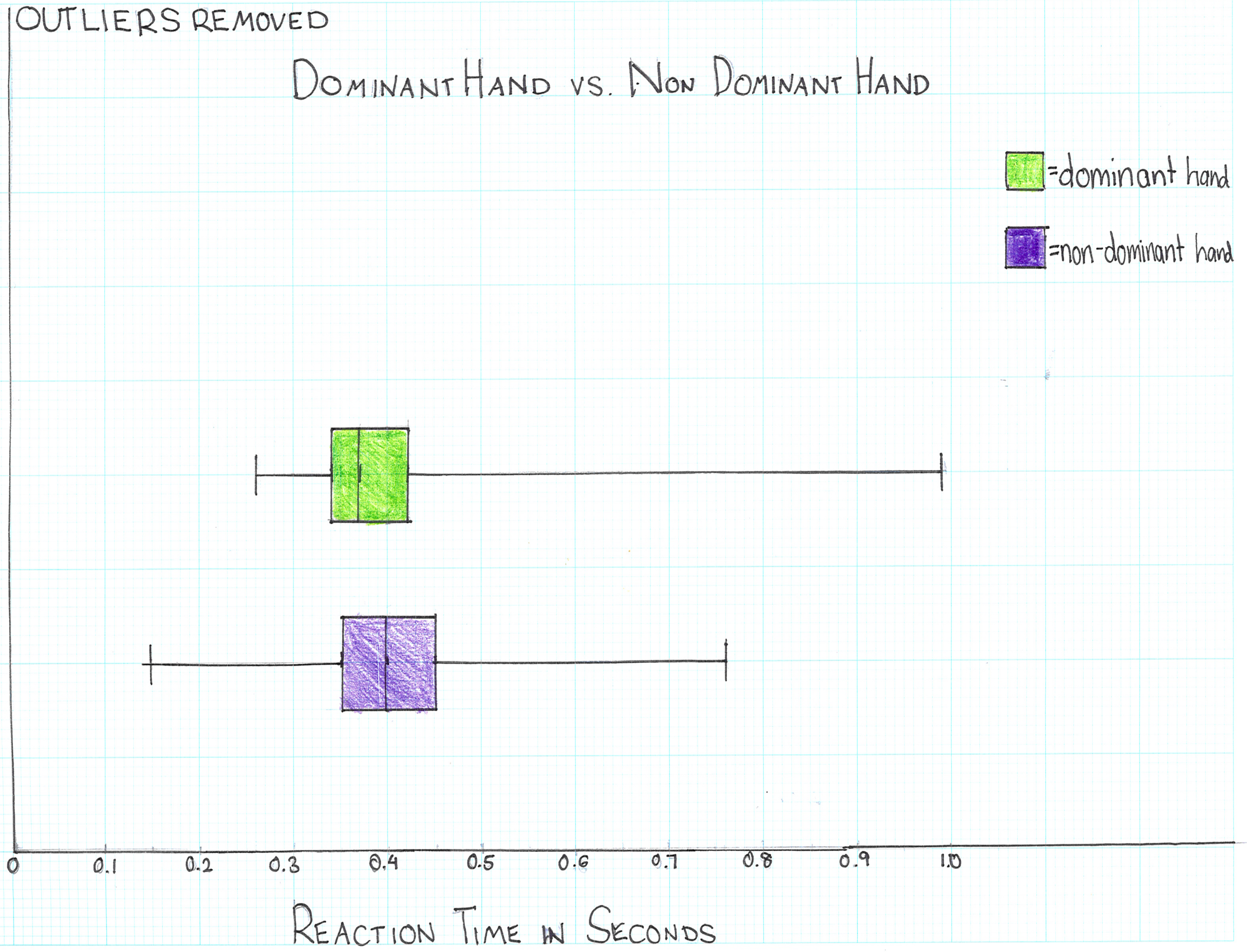
By looking at the box and whiskers graph attached, it can be seen that the first quartile for the dominant hand is at 0.34 seconds, and 0.01 seconds later begins quartile 2 of the non dominant hand, and the first section of both the dominant and non dominant hand is more densely populated than the fourth quartile.

Judging by these results, the dominant hand is marginally faster than the non dominant hand in terms of reaction time, making the hypothesis true.

As this experiment was done on a small scale and by amateurs with limited knowledge on the subject at hand, it is possible that the statement above is incorrect and further research and tests must be completed before it is definitive.

One website is quoted as saying "The average reaction time for humans is 0.25 seconds to a visual stimulus, 0.17 for an audio stimulus, and 0.15 seconds for a touch stimulus.", so based on our data we can guess that students were asked to respond to something visually. Another source tested reaction time by letting a ruler slip between one's fingers and found that the average reaction time for anybody from elementary school to their 40s took about 0.2 seconds to react, regardless of their dominant hand or non dominant hand was used. Those in their 60s took about 0.3 seconds to react, also regardless whether they used their dominant or non dominant hand. Interestingly, the people in their 70s tested took on average 0.4 seconds for their dominant hand and 0.5 seconds to react with their non dominant hand.

Some results found contradict the results shown by this specific experiment, so more tests must be underway before we can be sure of whether the dominant hand is marginally faster than the non dominant hand in terms of reaction time.



OUTLIERS REMOVED

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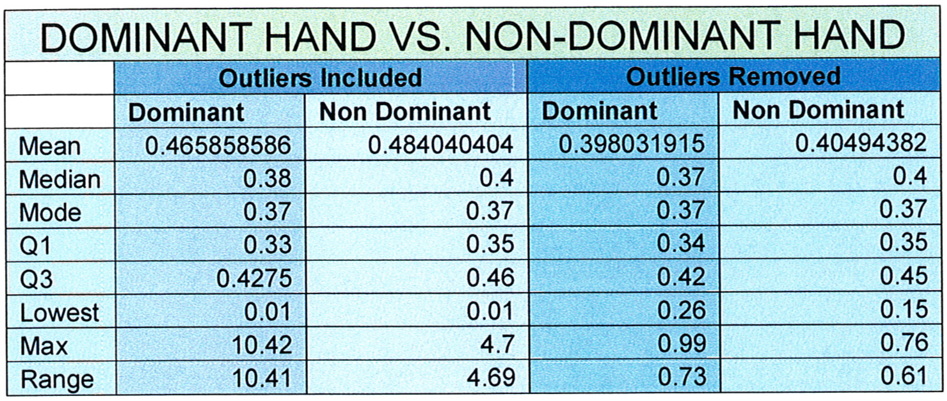

DOMINANT HAND VS. NON-DOMINANT HAND				
	Outliers Included		Outliers Removed	
	Dominant	**Non Dominant**	**Dominant**	**Non Dominant**
Mean	0.465858586	0.484040404	0.398031915	0.40494382
Median	0.38	0.4	0.37	0.4
Mode	0.37	0.37	0.37	0.37
Q1	0.33	0.35	0.34	0.35
Q3	0.4275	0.46	0.42	0.45
Lowest	0.01	0.01	0.26	0.15
Max	10.42	4.7	0.99	0.76
Range	10.41	4.69	0.73	0.61

Bibliography

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